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# Global Supervenience on Microphysics

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## Global Supervenience on Microphysics

*Abstract.* Many philosophers would agree with the claim that the truths reported by the special sciences supervene on the ways the world is at the level of the fundamental particles of physics. At the least this supervenience claim denies independent variability for the truths of the special sciences—but many would add that the ways the world is, microphysically, generate all the special science truths. Call this “Global Supervenience on Microphysics”. What it is for a special science claim to be true, says GSM, just is for the world to be a certain way microphysically. But which way? The popular suggestion is that the microphysical truth-condition for a given special-science statement is whatever microphysical arrangement it is, that renders true the causal import of the special-science statement. I argue that there is no fact of the matter as to which microphysical arrangement this is, and conclude that GSM may be untenable.

On p. 171 of *Austere Realism*, Horgan and Potrč (2007) write, “after all, it is very plausible that all truths about the world are supervenient on physics-level truths—that the physically describable facts determine all the facts”. This sort of claim is often made (e.g. Heil 2003, Ch. 5), and is often treated as a powerful claim—as saying not just that physicalism holds true for the realm of the mental, but that, quite generally, the story of the world told by physics generates *all* the truths about the ways the world is. Let us call this powerful claim “Global Supervenience on Microphysics”, or GSM. I argue here that the reasoning that often leads philosophers to favor GSM is badly incomplete, and that the position is quite possibly untenable.

One aspect of any supervenience thesis is a denial of independent variability, and here, I myself am inclined to agree, no very elaborate reasoning is necessary to defend GSM. It does seem intuitively plausible that the way the world is, with regard to biology or psychology or sociology or economics, could not be different from what it is without there being some difference at the level of the microparticles of physics.

But theses of supervenience also need to incorporate an explanation of *why* independent variation (in one domain or another) is impossible (Kim 1998, p. 13, Heil 1998, p. 146; Horgan 1993, §8). GSM in particular has a second need as well. It must say enough to ensure not just that *should* biological or psychological or sociological facts obtain in the world, they necessarily will track the facts of microphysics, but further that biological or psychological or sociological facts *will* occur in the world, given that microphysical facts do.

GSM can meet both needs simultaneously by offering a “nothing buttery” explanation of why independent variation is impossible. This explanation says that what it is for a statement of biology or psychology or sociology or economics to be true is “nothing over and above”, “nothing but”, the world’s being a certain way at the level of the microparticles. This explanation does not go so far as to say that each individual predicate wielded by the special sciences has, as its semantic value, one or another of the properties that are ascribed to the microparticles by microphysics, nor (of course) that the expressions used by the special sciences to designate one object or another, that satisfies a special-science predicate, pick out unitary items at the level of the microparticles. That would be a thesis of reduction, not of supervenience. What the explanation does say is that *all that there is* to being true, for any statement of a special science, is the instantiation, by *some* microparticles *or other*, of *some* microphysical properties *or other*. That is why independent variation is not possible, says the “nothing buttery” explanation. It is not that the statements of the special sciences report states of affairs that have a nature of their own, independent from the ways the world is at the level of microphysics, but that substantive laws of nature tie the obtaining of these special states of affairs to the ways the world is at the level of microphysics. No such metaphysical “glue” is affirmed by the explanation (cf. Lynch and Glasgow 2003, pp. 210-211; Horgan 1993, p. 578). The claim is rather that statements of the special sciences by nature could not *but* track the ways the world is microphysically—that it is the very nature of these statements to be made true or false by how matters stand with the microparticles (Horgan 1993, pp. 581-82; Horgan and Potrč 2007, Ch. 3).

But each individual claim of a special science must then depend for its truth on the world's being *some one particular* way at the level of the microparticles. Can we understand how such statements get the particular microphysical truth conditions that they have? A useful suggestion here is provided by one articulation of the “nothing buttery” thesis that is popular among philosophers who think that psychology supervenes on microphysics. This articulation says that the mental properties attributed to persons by psychology—in particular, the propositional attitudes attributed by belief/desire psychology—are actually higher-order properties. A person's having a given mental property M is that person's having the property of having—in virtue of his or her component microparticles—some complex microphysical property or other, such that the functional description that psychology associates with M will hold true of that person. The causal profile of the mental property ascribed by psychology is what fixes the truth-conditions of that ascription, at the level of microphysics.

But not all proponents of Global Supervenience on Microphysics would be comfortable with the claim that all predicates of the special sciences ascribe higher-order properties to objects that are posited by the special sciences. For this way of putting things commits us to saying that there really are such objects—that there are persons, for example—and this is a claim that some proponents of GSM are inclined to dispute (Horgan and Potrč 2007, Chs. 4, 5, and pp. 181-82; cf. Heil 2003, pp. 53, 190). Relatedly, the “higher-order property” idea entails that composition really occurs in the world—cf. “component” microparticles—and this too is something that some proponents of GSM question.

We can salvage what is useful about the “second-order property” idea, while avoiding what is questionable, by simply saying this. Any statement of a special science has some causal import or other. What it is for such a claim to be true is, at a first approximation, just for microparticles that occupy the volume of the object that the special science posits to have some microphysical properties or other, such that the causal import of the special science claim turns out to be true. Thus consider so simple a claim as “there is a dog lying over there”. At the level of perceptual psychology and animal ethology, one would say that the causal import of this claim is the (rather modest) prediction that if persons look in the direction indicated, they will have sensory experiences as of a lying dog, and that if a noisy vacuum

cleaner is moved into that location, the dog will scurry away, and observers will have sensory experiences as of a scurrying dog. The truth condition of “there is a dog lying over there”, then, will be that in the region indicated—and perhaps in other locations, about which more below—there are microparticles that are, in the widely used phrase, “dog-wise arranged” (cf. Merricks 2001). That is, there are microparticles that individually have the right microphysical properties, and that are related to one another by the right microphysical relations, that the implicit predictions of perceptual and behavioral outcomes will come out as true.

Or consider two other examples. To say of a person that she wants to drink water predicts that, in the right psychological setting, that person will reach for a glass of water if one is placed nearby. The truth condition for this ascription of desire will be (to a first approximation) that microparticles located within the person are so arranged, microphysically, that that prediction of a reaching for water will come out true. To say that some gene undergoes a fitness-enhancing mutation is to predict, in the right circumstances and with a certain probability, that some phenotypic innovation will be found in offspring of the organism in which the gene is located. The truth condition for this special-science assertion will be that microparticles located where the biologist supposes the gene to be have some microphysical properties and interrelations or other, such that the prediction of phenotypic alteration will come out true.

So microphysical truth-conditions are inherited, by a statement made in a special science, as a function of which microphysical properties and relations must be present, in the microparticles located at a particular location, in order for those microparticles to have the power to bring about some outcome predicted by the special-science statement. But at this point we must remember that the thesis of *Global Supervenience on Microphysics* requires a *global* “nothing but” claim. If the truth of any statement made by a special science is “nothing but”, “nothing over and above”, the world’s being a certain way at the level of the microparticles, then the power of certain microparticles to render true a special-science prediction of a certain outcome must be “nothing but”, “nothing over and above”, the power of those microparticles to bring about some outcome at the level of the microparticles themselves. In other words, for every outcome that lies in the causal import of a statement made by a special science, there must be

some state of affairs at the level of the microparticles which exhausts what it is for that outcome to occur—some microphysical state of affairs, the obtaining or non-obtaining of which renders true or renders false the report that that outcome is occurring.

It is therefore fair to ask: just what *does* it come to, at the level of microparticles, that the report “she is reaching for a glass of water” is true—or that “the dog is scurrying away” is true, or “the offspring has extra hemoglobin in his blood”? The first thing one wants to say in response is surely that the truth of any of these reports does not come to just one thing—just one sort of state of affairs—at the level of microphysics. Surely there are many, many different ways that microparticles might be so “arranged”—so characterized by intrinsic properties and so related to one another—that any one of these reports is rendered true. Here is an illustration that will make the point vivid. Imagine that there is an extremely powerful microscope—not just an electron microscope, but a quark microscope, say—that instantaneously reveals the microphysical state of every microparticle within a person who is reaching for a glass of water. Then the microscope has revealed *one* thing that the truth of “she reaches for a glass of water” can come to, at the level of microparticles. Or, at the least, the microscope has revealed *most* of what is involved, at the level of microparticles, in the being-true of that report. Perhaps the microphysical goings-on do not amount to truth for the claim that she reaches for *water* unless H<sub>2</sub>O is what is in the glass. In that case we must alter the illustration: we must say that the microscope takes a snapshot of all the microparticles within the person and in her surroundings. In any case, it seems abundantly clear that the next time a token of “she reaches for a glass of water” is true, our microscope will reveal a *different* state of affairs, at the level of the microparticles, that renders the token true.

Can we imagine that the disjunction of microphysical sufficient conditions, for the truth of tokens of “she reaches for a glass of water”, has a finite length—that there is a highly disjunctive sort of microphysical event that is not only a sufficient condition for the truth of “she reaches for a glass of water”, but that is also a necessary condition? Let me first explain why the proponent of GSM should hope that the answer is Yes. Then I will say that it is very implausible that the answer is Yes, and that for this reason the proponent of GSM has serious trouble.

Return again to the global “nothing but” thesis. This says that what it is for any assertion at the level of the special sciences to be true is nothing but, nothing over and above, the world’s being a certain way with respect to the microparticles. What this position asserts is a *two-fold* dependence. On the one hand, the position says that if a statement in the special sciences is true, it is so in virtue of the world’s being some way at the level of the microparticles; but on the other hand, the position says that if that same statement is false, it is so in virtue of the world’s failing to be some way at the level of the microparticles. In other words: if, for any statement in the special sciences, there is a truth-*condition* at the level of microphysics, there is some way for the world to be, microphysically, that is *necessary* for the truth of the statement.

At the same time, there is the point that the statements affirmed in the special sciences include not just (what Quine called) “occasion sentences”—statements such as “she is reaching for a glass of water”, “the observers are having sensory experiences as of a dog”, “the offspring has extra hemoglobin”—but also generalizations. Psychology might say that any person who desires to drink water will, under such-and-such circumstances, reach for a glass of water that is placed nearby. Discussions of perception might say that, under normal viewing conditions, any observer who looks in the direction of a dog will have doggish sensory experiences. Genetics might say that any genetic mutations, involving such-and-such important genes, will lead either to failures of intrauterine development, or to the presence of phenotypic alterations.

Here is why the point about generalizations matters. Even if some powerful mind has been running our quark microscope for some time, and has taken snapshots of many different microphysical sufficient conditions for the truth of “she reaches for a glass of water”, it still can be true that *some* microphysical arrangement in *some* agent has the power to bring about *some* microphysical outcome that renders true a token of “she reaches for a glass of water”, even though that arrangement does not have the power to bring about one of the outcomes of which the microscope has taken a snapshot. For there to be a truth-condition at the level of the microparticles, for a generalization that talks generally about reachings-for-glasses-of-water—a generalization that says that *any* person who desires water will, under certain

circumstances, reach for a nearby glass of water—there has to be a fact of the matter as to *all* that a reaching-for-water *could* amount to, at the level of microparticles.

The proponent of GSM must therefore say that the answer to our earlier question is Yes. For any outcome that lies within the causal import a statement made by a special science, there must be a finite and closed disjunction of microphysical states of affairs, that is *what it is* for reports of that outcome to be true.

But this very position seems highly implausible, from the standpoint of GSM itself. No disjunction of microphysical arrangements actually recorded in the snapshots taken by our quark microscope, at all times up to a given point in the world's history when the special-science reports of the outcome have been true, can be counted on to tell us *all* that that the truth of such reports can amount to, at the level of microphysics. One could indeed suppose that there is a more subtle route by which a finite and closed truth-condition, at the level of microphysics, gets determined for special-science reports of the relevant outcome. One could suppose that the outcome reported by these special-science claims has its own distinctive nature, and that there is a determinate answer to a certain question of “reverse engineering”: just how might God arrange microparticles, in such a way as to ensure that an outcome having just that special nature does occur? But precisely what the “nothing buttery” claim associated with GSM denies is that statements in the special sciences report states of affairs that have their own distinctive nature. On the contrary, says the “nothing buttery” claim: truth and falsity, for claims in any special science, cannot *but* track ways that the world is at the level of the microparticles, for these statements do not report states of affairs distinct in their natures from ways that the world may be at the level of the microparticles.

GSM involves a distinctive “nothing buttery” claim. Proponents of GSM have not adequately asked themselves just how that claim can be articulated and defended. My own judgement is that it cannot be defended, and that GSM is untenable.



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